

a driver circuit comprising a plurality of first thin film transistors over the substrate for driving the switching thin film transistor;

a time division gray-scale data signal generating circuit comprising a plurality of second thin film transistors over the substrate for dividing one frame period into a plurality of sub-frame periods,

wherein a gray scale display is provided by controlling a period of time at which the EL element emits light in the one frame period,

wherein a potential of the first or the second electrode changes in such a manner that a polarity of an EL driving voltage is inverted for each one frame period, and

wherein the EL driving voltage is a difference between the potentials applied to the first and the second electrodes.

52.(New) An active matrix-type display device according to claim 51, wherein the one frame period is 1/120 s or less.

53.(New) An active matrix-type display device according to claim 51, wherein the organic EL material comprises a low molecular organic material selected from the group consisting of Alq_3 (tris-8-quinolylite-aluminum), and TPD (triphenylamine derivative).

54.(New) An active matrix-type display device according to claim 51, wherein the organic EL material comprises a polymer organic material selected from the group consisting of PPV (polyphenylenevinylene), PVK (polyvinyl-caracole), and polycarbonate.

55.(New) An active matrix-type display device according to claim 51, wherein the first electrode is anode and the second electrode is cathode.

56.(New) An active matrix-type display device according to claim 51, wherein the first electrode is cathode and the second electrode is anode.

57.(New) An active matrix-type display device according to claim 51, wherein the active matrix type display device is incorporated in at least one selected from the group consisting of a personal computer, a video camera, a head mount display, a DVD player, a mobile computer, a digital camera, a mobile phone, and an electronic book.

58.(New) An active matrix-type display device comprising:
an EL driving thin film transistor over a substrate;
a switching thin film transistor over the substrate; and
an EL element comprising a first electrode, an organic EL material over the first electrode, and a second electrode over the organic EL material, wherein the EL element is electrically connected to the EL driving thin film transistor,

wherein a gray scale display is provided by inputting an analog video signal to the switching thin film transistor,

wherein a potential of the first or the second electrode changes in such a manner that a polarity of an EL driving voltage is inverted for each one frame period, and

wherein the EL driving voltage is a difference between the potentials applied to the first and the second electrodes.

59.(New) An active matrix-type display device according to claim 58, wherein the one frame period is 1/120 s or less.

60.(New) An active matrix-type display device according to claim 58, wherein the organic EL material comprises a low molecular organic material selected from the group consisting of Alq₃ (tris-8-quinolylite-aluminum), and TPD (triphenylamine derivative).

61.(New) An active matrix-type display device according to claim 58, wherein the organic EL material comprises a polymer organic material selected from the group consisting of PPV (polyphenylenevinylene), PVK (polyvinyl-caracole), and polycarbonate.

62.(New) An active matrix-type display device according to claim 58, wherein the first electrode is anode and the second electrode is cathode.

63.(New) An active matrix-type display device according to claim 58, wherein the first electrode is cathode and the second electrode is anode.

64.(New) An active matrix-type display device according to claim 58, wherein the active matrix type display device is incorporated in at least one selected from the group consisting of a personal computer, a video camera, a head mount display, a DVD player, a mobile computer, a digital camera, a mobile phone, and an electronic book.

65.(New) An active matrix-type display device comprising:
an EL driving thin film transistor over a substrate;
a switching thin film transistor over the substrate; and
an EL element comprising a first electrode, an organic EL material over the first electrode, and a second electrode over the organic EL material, wherein the EL element is electrically connected to the EL driving thin film transistor,

wherein a gray scale display is provided by controlling a period of time at which the EL element emits light in the one frame period,

wherein a potential of the second electrode is held constant and a potential of the first electrode changes in such a manner that a polarity of an EL driving voltage is inverted for each one frame period, and

wherein the EL driving voltage is a difference between the potentials applied to the first and the second electrodes.

66.(New) An active matrix-type display device according to claim 65, wherein the one frame period is 1/120 s or less.

67.(New) An active matrix-type display device according to claim 65, wherein the organic EL material comprises a low molecular organic material selected from the group consisting of Alq₃ (tris-8-quinolylite-aluminum), and TPD (triphenylamine derivative).

68.(New) An active matrix-type display device according to claim 65, wherein the organic EL material comprises a polymer organic material selected from the group consisting of PPV (polyphenylenevinylene), PVK (polyvinyl-caracole), and polycarbonate.

69.(New) An active matrix-type display device according to claim 65, wherein the first electrode is anode and the second electrode is cathode.

70.(New) An active matrix-type display device according to claim 65, wherein the first electrode is cathode and the second electrode is anode.

71.(New) An active matrix-type display device according to claim 65, wherein the active matrix type display device is incorporated in at least one selected from the group consisting of a personal computer, a video camera, a head mount display, a DVD player, a mobile computer, a digital camera, a mobile phone, and an electronic book.

72.(New) An active matrix-type display device comprising:
an EL driving thin film transistor over a substrate;
a switching thin film transistor over the substrate;
a first insulating film comprising a resin material over the EL driving thin film transistor and the switching thin film transistor;
a second insulating film on a portion of the first insulating film; and
an EL element comprising a first electrode formed on the first insulating film, an organic EL material over the first electrode, and a second electrode over the organic EL material, wherein the EL element is electrically connected to the EL driving thin film transistor,

wherein a gray scale display is provided by controlling a period of time at which the EL element emits light in the one frame period,

wherein a potential of the first or the second electrode changes in such a manner that a polarity of an EL driving voltage is inverted for each one frame period, and

wherein the EL driving voltage is a difference between the potentials applied to the first and the second electrodes.

73.(New) An active matrix-type display device according to claim 72, wherein the one frame period is 1/120 s or less.

74.(New) An active matrix-type display device according to claim 72, wherein the organic EL material comprises a low molecular organic material selected from the group consisting of Alq₃ (tris-8-quinolylite-aluminum), and TPD (triphenylamine derivative).

75.(New) An active matrix-type display device according to claim 72, wherein the organic EL material comprises a polymer organic material selected from the group consisting of PPV (polyphenylenevinylene), PVK (polyvinyl-caracole), and polycarbonate.

76.(New) An active matrix-type display device according to claim 72, wherein the first insulating film comprises one selected from the group consisting of polyimide, polyamide, acrylic resin, and BCB (benzocyclobutene).

77.(New) An active matrix-type display device according to claim 72, wherein the second insulating film comprises one selected from the group consisting of silicon oxide, silicon nitride oxide, and an organic resin.

78.(New) An active matrix-type display device according to claim 72, wherein the first electrode is anode and the second electrode is cathode.

79.(New) An active matrix-type display device according to claim 72, wherein the first electrode is cathode and the second electrode is anode.

80.(New) An active matrix-type display device according to claim 72, wherein the active matrix type display device is incorporated in at least one selected from the group consisting of a personal computer, a video camera, a head mount display, a DVD player, a mobile computer, a digital camera, a mobile phone, and an electronic book.

81.(New) An active matrix-type display device comprising:

an EL driving thin film transistor over a substrate;

a switching thin film transistor over the substrate;

an EL element comprising a first electrode, an organic EL material over the first electrode, and a second electrode over the organic EL material, wherein the EL element is electrically connected to the EL driving thin film transistor; and

a driver circuit comprising a plurality of first thin film transistors over the substrate for driving the switching thin film transistor;

a time division gray-scale data signal generating circuit comprising a plurality of second thin film transistors over the substrate for dividing one frame period into a plurality of sub-frame periods,

wherein a gray scale display is provided by controlling a sum of lengths of sub-frame periods in which the EL element emits light out of the plurality of sub-frame periods included in one frame period,

wherein a potential of the first or the second electrode changes in such a manner that a polarity of an EL driving voltage is inverted for each one sub-frame period, and

wherein the EL driving voltage is a difference between the potentials applied to the first and the second electrodes.

82.(New) An active matrix-type display device according to claim 81, wherein the one frame period is 1/120 s or less.

83.(New) An active matrix-type display device according to claim 81, wherein the organic EL material comprises a low molecular organic material selected from the group consisting of Alq₃ (tris-8-quinolylite-aluminum), and TPD (triphenylamine derivative).

84.(New) An active matrix-type display device according to claim 81, wherein the organic EL material comprises a polymer organic material selected from the group consisting of PPV (polyphenylenevinylene), PVK (polyvinyl-caracole), and polycarbonate.

85.(New) An active matrix-type display device according to claim 81, wherein the first insulating film comprises one selected from the group consisting of polyimide, polyamide, acrylic resin, and BCB (benzocyclobutene).

86.(New) An active matrix-type display device according to claim 81, wherein the second insulating film comprises one selected from the group consisting of silicon oxide, silicon nitride oxide, and an organic resin.

87.(New) An active matrix-type display device according to claim 81, wherein the first electrode is anode and the second electrode is cathode.

88.(New) An active matrix-type display device according to claim 81, wherein the first electrode is cathode and the second electrode is anode.

89.(New) An active matrix-type display device according to claim 81, wherein the active matrix type display device is incorporated in at least one selected from the group consisting of a personal computer, a video camera, a head mount display, a DVD player, a mobile computer, a digital camera, a mobile phone, and an electronic book.

90.(New) An active matrix-type display device comprising:
an EL driving thin film transistor over a substrate;

a switching thin film transistor over the substrate; and
an EL element comprising a first electrode, an organic EL material over the first electrode,
and a second electrode over the organic EL material, wherein the EL element is electrically connected
to the EL driving thin film transistor,

wherein a gray scale display is provided by controlling a sum of lengths of sub-frame periods
in which the EL element emits light out of the plurality of sub-frame periods included in one frame
period,

wherein a potential of the second electrode is held constant and a potential of the first
electrode changes in such a manner that a polarity of an EL driving voltage is inverted for each one
sub-frame period, and

wherein the EL driving voltage is a difference between the potentials applied to the first and
the second electrodes.

91.(New) An active matrix-type display device according to claim 90, wherein the one frame
period is 1/120 s or less.

92.(New) An active matrix-type display device according to claim 90, wherein the organic EL
material comprises a low molecular organic material selected from the group consisting of Alq₃
(tris-8-quinolylite-aluminum), and TPD (triphenylamine derivative).

93.(New) An active matrix-type display device according to claim 90, wherein the organic EL
material comprises a polymer organic material selected from the group consisting of PPV
(polyphenylenevinylene), PVK (polyvinyl-caracole), and polycarbonate.

94.(New) An active matrix-type display device according to claim 90, wherein the first
insulating film comprises one selected from the group consisting of polyimide, polyamide, acrylic
resin, and BCB (benzocyclobutene).

95.(New) An active matrix-type display device according to claim 90, wherein the second insulating film comprises one selected from the group consisting of silicon oxide, silicon nitride oxide, and an organic resin.

96.(New) An active matrix-type display device according to claim 90, wherein the first electrode is anode and the second electrode is cathode.

97.(New) An active matrix-type display device according to claim 90, wherein the first electrode is cathode and the second electrode is anode.

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98.(New) An active matrix-type display device according to claim 90, wherein the active matrix type display device is incorporated in at least one selected from the group consisting of a personal computer, a video camera, a head mount display, a DVD player, a mobile computer, a digital camera, a mobile phone, and an electronic book.

99.(New) An active matrix-type display device comprising:

an EL driving thin film transistor over a substrate;

a switching thin film transistor over the substrate;

a first insulating film comprising a resin material over the EL driving thin film transistor and the switching thin film transistor;

a second insulating film on a portion of the first insulating film; and

an EL element comprising a first electrode formed on the first insulating film, an organic EL material over the first electrode, and a second electrode over the organic EL material, wherein the EL element is electrically connected to the EL driving thin film transistor,

wherein a gray scale display is provided by controlling a sum of lengths of sub-frame periods in which the EL element emits light out of the plurality of sub-frame periods included in one frame period,

wherein a potential of the first or the second electrode changes in such a manner that a polarity of an EL driving voltage is inverted for each one sub-frame period, and

wherein the EL driving voltage is a difference between the potentials applied to the first and the second electrodes.

100.(New) An active matrix-type display device according to claim 99, wherein the one frame period is 1/120 s or less.

101.(New) An active matrix-type display device according to claim 99, wherein the organic EL material comprises a low molecular organic material selected from the group consisting of Alq₃ (tris-8-quinolylite-aluminum), and TPD (triphenylamine derivative).

102.(New) An active matrix-type display device according to claim 99, wherein the organic EL material comprises a polymer organic material selected from the group consisting of PPV (polyphenylenevinylene), PVK (polyvinyl-caracole), and polycarbonate.

103.(New) An active matrix-type display device according to claim 99, wherein the first insulating film comprises one selected from the group consisting of polyimide, polyamide, acrylic resin, and BCB (benzocyclobutene).

104.(New) An active matrix-type display device according to claim 99, wherein the second insulating film comprises one selected from the group consisting of silicon oxide, silicon nitride oxide, and an organic resin.

105.(New) An active matrix-type display device according to claim 99, wherein the first electrode is anode and the second electrode is cathode.

106.(New) An active matrix-type display device according to claim 99, wherein the first electrode is cathode and the second electrode is anode.